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10/584,882	06/29/2006	Fariba Hatami	3367-103	7738

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EXAMINER	
KIM, JAY C	

ART UNIT	PAPER NUMBER
2815	

NOTIFICATION DATE	DELIVERY MODE
09/22/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-PAT-Email@rfem.com

Office Action Summary	Application No.	Applicant(s)	
	10/584,882	HATAMI ET AL.	
	Examiner	Art Unit	
	JAY C. KIM	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *8-10 and 15-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 11-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to Amendment filed July 20, 2009.

Claim Objections

1. Claim 6 is objected to because of the following informalities: "include" should be replaced by "includes" on line 3. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 6 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 6, it is not clear what "the values of x potentially differing (emphasis added)" refers to, because "potential" is defined as "existing in possibility" by Merriam-Webster dictionary, and therefore the recited limitation suggests that the values of x *may or may not* be differing, which is indefinite. Further, it is not clear what "said semiconductor layers" refer to, that is, whether "said semiconductor layers" refer to all of the first semiconductor region, the second semiconductor region and the active semiconductor region, or any two regions of the first semiconductor region, the second semiconductor region and the active semiconductor region, or other semiconductor layers. Claim 7 depends on claim 6, and therefore claim 7 is also indefinite.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 5 and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Okuyama et al. (US 2002/0145148).

Regarding claim 1, Okuyama et al. disclose a semiconductor device (Fig. 12) for emitting light when a voltage is applied comprising a first semiconductor region (159) (line 10 of [0116]) whose conductivity is based on charge carriers (electrons) of a first conductivity type (n-type), a second semiconductor region (158) (lines 11-12 of [0116]) whose conductivity is based on charge carriers (holes) of a second conductivity type (p-type), which have a charge opposite to the charge carriers of the first conductivity type, and an active semiconductor region (160) (line 11 of [0116]) which is arranged between the first semiconductor region (159) and the second semiconductor region (158), in which quantum structures (two sides of triangular structures) of a semiconductor material (InGaN) with a direct band gap are embedded in at least two different configurations (two sides of triangular structures) which are coupled to each other, and an associated switching device (170) (lines 1-5 of [0117]) for influencing a current flowing through the active semiconductor region (160).

Further regarding claim 1, the claim limitation "which is so designed as to switch to and fro at least between a current flow through the active semiconductor region with

a current intensity below a given threshold current intensity and a current flow through the active semiconductor region with a current intensity above the threshold current intensity" specifies an intended use or field of use, and is treated as non-limiting since it has been held that in device claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex Parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claim 5, Okuyama et al. further disclose that the first semiconductor region (159), the second semiconductor region (158) and the active semiconductor region (160) are embodied in the form of semiconductor layers of a layer stack.

Regarding claim 11, Okuyama et al. disclose a semiconductor device (Fig. 12) as set forth in claim 1 characterised by being in the form of a light emitting diode (lines 1-3 of [0116]).

Regarding claim 12, Okuyama et al. disclose a display device having an array-like arrangement of semiconductor devices as set forth in claim 1 ([0006] and [0120]).

Regarding claims 13 and 14, Okuyama et al. further disclose that the switching device (170) is adapted to output for each semiconductor device its own switching

signal (claim 13), and that each semiconductor device has its own switching device associated therewith (claim 14), which are *inherent* to emit light with a different wavelength and also to be used as a pixel of a display device.

6. Claims 1, 2, 5 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Shields et al. (US 2003/0127608).

Regarding claim 1, Shields et al. disclose a semiconductor device (Figs. 2 and 6) for emitting light when a voltage is applied comprising a first semiconductor region (23) (lines 4-7 of [0148]) whose conductivity is based on charge carriers (holes) of a first conductivity type (p-type), a second semiconductor region (31) ([0152]) whose conductivity is based on charge carriers (electrons) of a second conductivity type (n-type), which have a charge opposite to the charge carriers of the first conductivity type, and an active semiconductor region (composite layer of 25, 27 and 29) (lines 7-8 of [0148], lines 4-6 of [0149], and lines 1-2 of [0151]) which is arranged between the first semiconductor region (23) and the second semiconductor region (31), in which quantum structures (27) of a semiconductor material (InAs) with a direct band gap are embedded in at least two different configurations which are coupled to each other, which is *inherent* when InAs quantum dots are formed by Stranski-Krastanov mechanism (lines 6-8 of [0149]), and an associated switching device for influencing a current flowing through the active semiconductor region (composite layer of 25, 27 and 29), which is *inherent* to apply a voltage as shown in Fig. 6.

Further regarding claim 1, the claim limitation "which is so designed as to switch to and fro at least between a current flow through the active semiconductor region with

a current intensity below a given threshold current intensity and a current flow through the active semiconductor region with a current intensity above the threshold current intensity" specifies an intended use or field of use, and are treated as non-limiting since it has been held that in device claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. *In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex Parte Masham*, 2 USPQ 2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding claim 2, Shields et al. further disclose that InAs quantum dots are present as a configuration of the quantum structures (27) and a quantum well layer is present as a second configuration of the quantum structures (27), which is *inherent* when InAs quantum dots are formed by Stranski-Krastanov mechanism (lines 6-8 of [0149]).

Regarding claim 5, Shields et al. further disclose for the semiconductor device as set forth in claim 1 that the first semiconductor region (23), the second semiconductor region (31) and the active semiconductor region (composite layer of 25, 27 and 29) are embodied in the form of semiconductor layers of a layer stack.

Regarding claim 11, Shields et al. disclose a semiconductor device as set forth in claim 1 characterised by being in the form of a light emitting diode (Fig. 2).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shields et al. (US 2003/0127608). The teachings of Shields et al. are discussed above.

Regarding claims 3 and 4, Shields et al. differ from the claimed invention by not showing that the quantum dots are of a lateral extent which on average is less than about 50 nm (claim 3), wherein the average lateral extent of the quantum dots is in the range of between 10 and 30 nm (claim 4).

The claims are prima facie obvious without showing that the claimed ranges of a lateral extent achieves unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In*

re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious).

Response to Arguments

9. Applicants' arguments filed July 20, 2009 have been fully considered but they are not persuasive.

Applicants argue that "the specification of the present application expressly defines quantum structures as "structures which in at least one direction of extent are of a dimension which is so small that the properties of the structure are substantially also determined by quantum-mechanical processes", and that "it further defines configurations of quantum structures that can be considered as quantum dots, quantum wires and quantum wells". Applicants did not expressly define "quantum structures" and "configuration of quantum structures" in the specification. Rather, Applicants suggested what may be considered "quantum structures" and "configurations of quantum structures". Also, it is improper to import claim limitations from specification. See MPEP 2111.01. In other words, Applicants do not specifically claim what "quantum structures" and "configurations of quantum structures" refer to. Further, Applicants did not provide any evidence that the thickness of the InGaN quantum structures (two sides of triangular structures) 160 disclosed by Okuyama et al. is not so small that the properties of the structure 160 cannot be substantially determined by quantum-mechanical processes.

Applicants argue that "Okuyama discloses a multi-quantum well structure which is clearly not two different configurations of quantum structures under the definition

explicitly set forth in the specification of the present application", and that "a multiple-well quantum structure as disclosed in Okuyama only comprises one configuration of quantum structures, namely quantum wells". First, it is not clear why Applicants use Fig. 1G of Okuyama et al. to make arguments over rejection of claim 1, because the Examiner used Fig. 12 of Okuyama et al. to reject claim 1. Second, these arguments are not relevant to rejection of claim 1 over Okuyama et al., because the Examiner *clearly* stated that the two different configurations are "two sides of triangular structures" of InGaN layer 160. Further, it is improper to import claim limitations from specification. See MPEP 2111.01.

Applicants argue that "Applicant respectfully submits that Okuyama does not and can not anticipate each and every element of present claim 1, and its dependent claims". As stated above, Okuyama et al. disclose all the limitations of claim 1.

Applicants argue that "Applicant respectfully submits that Shields does not and can not anticipate each and every element of present claim 1, and its dependent claims". This argument and further arguments on Shields et al. on page 10 of REMARKS are not relevant to rejection of claim 1, because these arguments are based on an embodiment (Fig. 22) of Shields et al. different from the embodiment (Fig. 2) of Shields et al. that the Examiner used to reject claim 1.

It is not clear why Applicants mentioned combination of Shields et al. and Okuyama et al., because the Examiner never considered combination of Shields et al. and Okuyama et al.

Conclusion

10. Applicants' amendment necessitated the new ground of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAY C. KIM whose telephone number is (571) 270-1620. The examiner can normally be reached on 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. K./
Examiner, Art Unit 2815
September 14, 2009

/Jerome Jackson Jr./
Primary Examiner, Art Unit 2815